



UNITED STATES PATENT AND TRADEMARK OFFICE

9b
UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/266,012	03/11/1999	YUKIO YAMAUCHI	0756-1947	5203

31780 7590 12/11/2002

ERIC ROBINSON
PMB 955
21010 SOUTHBANK ST.
POTOMAC FALLS, VA 20165

EXAMINER

RICHARDS, N DREW

ART UNIT PAPER NUMBER

2815

DATE MAILED: 12/11/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/266,012

Applicant(s)

YAMAUCHI ET AL.

Examiner

N. Drew Richards

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 July 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 6-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6-8 and 13 is/are allowed.
- 6) ☒ Claim(s) 1-3, 9-12 and 14-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 08/617,121.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 9 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9 lines 11 and 12-13 recite a limitation of an electroluminescence layer comprising an organic material adjacent the transparent electrode. It is indefinite as to whether there are two separate organic layer adjacent the electrode or whether the limitation is repeated in error. For the art rejections below, it is assumed that there is only one organic layer.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

4. Claim 19 is rejected under 35 U.S.C. 102(e) as being anticipated by Tang et al. (U.S. Patent No. 5,550,066).

Tang et al. disclose in figures 1-9 and on columns 1-14 an organic electroluminescent display device. Specifically Tang et al. disclose a pixel array (figure 1) of an organic electroluminescent device provided on an insulating substrate 41 (figure 3), an island (polysilicon island as labeled in figure 4) having a polycrystalline silicon (polysilicon as labeled in figure 4) semiconductor formed thereon in a predetermined pattern provided on the substrate, and a thin film transistor (n+ source and drain with i channel and gate 44 as shown in figure 3) formed in the island. The claimed thin film transistor is interpreted consistent with the disclosure of the instant application. That is, each pixel block consists of two transistors readable as a thin film transistor, see figure 4. Figure 4 of the present invention shows a thin film transistor as two transistors 404_x and 405_x in each pixel block. Hence, Tang et al. is interpreted likewise as disclosing a single pixel block with two transistors readable as a single thin film transistor as seen in figures 1 and 2. The thin film transistor of Tang et al. is used as a pixel driving device and a peripheral driving circuit device. TFT2 (figure 2) is considered to be a pixel driving device as it controls the electroluminescent device while TFT1 (figure 2) is considered a peripheral driving circuit device as it is on a peripheral of the TFT2 and EL PAD and supplies driving power to the TFT2.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 3, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Moeller et al. (U.S. Patent No. 4,511,756).

Applicant's admitted prior art teaches on page 1 line 8 through page 2 line 4 an electroluminescence display device. The admitted prior art device comprises a thin film transistor formed over a substrate having an active layer of silicon including a source, drain, and channel region. The admitted prior art does not explicitly state that it is formed on a substrate having an insulated surface, however it is well known to one of ordinary skill in the art at the time of the invention to form thin film transistors on insulating substrates. The admitted prior art also teaches an electrode comprising aluminum electrically connected to one of the source and drain regions having a barrier metal interposed between the electrode and the source or drain region to prevent a direct contact therebetween. The admitted prior art also teaches a transparent electrode electrically connected to the thin film transistor and an organic electroluminescence layer adjacent to the transparent electrode. The admitted prior art does not teach forming a barrier metal of titanium.

Moeller et al. teach a method of forming aluminum on silicon. Moeller et al. teach a barrier metal layer between the aluminum and the silicon. Moeller et al. teach on line

Art Unit: 2815

4 of the abstract using a barrier metal comprising titanium. With respect to claim 3, Moeller et al. teach that the barrier metal contains nitrogen.

With regard to claim 12, Moeller et al. teach the barrier metal layer comprising titanium nitride where a concentration of nitrogen is 50 atm% or less. This is inherently taught as Moeller et al. form a titanium nitride layer and titanium nitride is one atom titanium to one atom nitride, thus 50 atm% nitride.

Applicant's admitted prior art and Moeller et al. are combinable because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to provide a barrier metal of titanium nitride between the silicon source or drain and the aluminum electrode. The motivation for doing so is prevent diffusion of aluminum into the silicon source or drain region. Therefore, it would have been obvious to combine Applicant's admitted prior art with Moeller et al. to obtain the invention of claims 1, 3, and 12.

7. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art with Moeller et al. (U.S. Patent No. 4,511,756) as applied to claim 1 above, further in view of Tang et al. (U.S. Patent No. 5,550,066).

Applicant's admitted prior art with Moeller et al. teach forming a transparent electrode but do not disclose forming it of indium tin oxide. Tang et al. teach an organic EL display device which has an indium tin oxide transparent electrode. Tang et al. and Applicant's admitted prior art are from the same field of endeavor. It would have been obvious to one of ordinary skill in the art at the time of the invention to use an indium tin

Art Unit: 2815

oxide electrode as indium tin oxide (commonly referred to as ITO) is a well known and long established transparent conductor. Therefore, it would have been obvious to combine Applicant's admitted prior art and Moeller et al. with Tang et al. to obtain the invention of claim 2.

8. Claims 9 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang et al. with Applicant's admitted prior art, and further in view of Moeller et al. (U.S. Patent No. 4,511,756).

With regards to claim 9, Tang et al. teach a device having a substrate with an insulating surface, a thin film transistor having an active layer comprising crystalline silicon including source, drain and channel regions, a transparent electrode electrically connected to the thin film transistor, an electroluminescence layer comprising an organic material adjacent to the transparent electrode, and a peripheral driving circuit comprising another thin film transistor formed over the substrate. Tang et al. do not teach an electrode comprising aluminum electrically connected to one of the source and drain regions and a barrier metal layer interposed between the electrode and the one of the source and drain regions to prevent a direct contact therebetween. This is taught by Applicant's admitted prior art to allow low resistance electrical communication with a diffusion barrier to prevent silicon diffusing from the active layer to the electrode. Neither Tang et al. nor Applicant's admitted prior art teach that the conductive layer comprises titanium. Moeller et al. teach using a titanium barrier as discussed above with regards to claims 1 and 3. At the time of the invention it would have been obvious

to use the barrier layer of Moeller et al. to prevent diffusion of aluminum into the silicon source or drain region.

With regards to claim 14, Moeller et al. teach the barrier metal layer comprising titanium nitride where a concentration of nitrogen is 50 atm% or less. This is inherently taught as Moeller et al. form a titanium nitride layer and titanium nitride is one atom titanium to one atom nitride, thus 50 atm% nitride.

9. Claims 10, 11 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang et al. (U.S. Patent No. 5,550,066) in view of Takemura (U.S. Patent No. 5,828,429).

Tang et al. disclose an electroluminescence display device on columns 1-14 and in figures 1-9. More specifically, Tang et al. disclose a substrate 41 having an insulating surface, at least one X-direction signal line over the substrate and at least one Y-direction signal line crossing the X-direction signal line as seen in figure 1, a thin film transistor formed over the substrate at an intersection of the X-direction and Y-direction signal lines having an active layer comprising crystalline silicon including source, drain, and channel regions, a transparent electrode (anode electrode), and an organic electroluminescence layer 82 adjacent to the transparent electrode. The structure of the organic electroluminescence display device can be seen in figure 8. Tang et al. do not explicitly disclose a peripheral driving circuit comprising another thin film transistor formed over the substrate for supplying a signal to one of the X-direction or Y-direction signal lines. Takemura teach an electroluminescent display device having a peripheral

Art Unit: 2815

driving circuit comprising a thin film transistor formed over the substrate for supplying a signal to one of the X-direction and Y-direction signal lines in column 16 lines 48-52 where the thin film transistor has an active layer comprising crystalline silicon.

With regard to claim 11, the thin film transistor and another thin film transistor being manufactured through the same process is a product-by-process limitation that does not structurally distinguish over the prior art.

Tang et al. and Takemura are combinable because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to provide a second thin film transistor in a peripheral driving circuit for supplying a signal to the X-direction or Y-direction signal lines. The motivation for doing so is to allow controllable selection and switching on and off of the electroluminescent devices. Therefore, it would have been obvious to combine Tang et al. with Takemura to obtain the invention of claims 10 and 11.

With regard to claim 15, Tang et al. disclose an electroluminescence display device including a substrate 41 having an insulating surface, at least one X-direction signal line over the substrate and at least one Y-direction signal line crossing the X-direction signal line as seen in figure 1, at least one pixel defined at an intersection between the X-direction and Y-direction signal lines, at least one switching thin film transistor and one current control thin film transistor formed over the substrate in the pixel, and organic electroluminescence layer 82 over the substrate. Tang et al. do not explicitly disclose a peripheral driving circuit comprising at least a third thin film transistor formed over the substrate for supplying a signal to one of the X-direction or Y-

Art Unit: 2815

direction signal lines. Takemura teach an electroluminescent display device having a peripheral driving circuit comprising a third thin film transistor formed over the substrate for supplying a signal to one of the X-direction and Y-direction signal lines in column 16 lines 48-52. Tang et al. further teach the transistors comprising a semiconductor layer comprising crystalline silicon and including source, drain and channel regions, a gate insulating film adjacent to the semiconductor layer and a gate electrode adjacent the gate insulating film. One of ordinary skill in the art would recognize that the in the combination the third transistor would be formed with a similar structure as the switching and current control transistors. With regard to claim 16, the gate electrode can be seen over the channel region with the gate insulating film interposed therebetween.

Tang et al. and Takemura are combinable because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to provide a third thin film transistor in a peripheral driving circuit for supplying a signal to the X-direction or Y-direction signal lines. The motivation for doing so is to allow controllable selection and switching on and off of the electroluminescent devices. Therefore, it would have been obvious to combine Tang et al. with Takemura to obtain the invention of claims 15 and 16.

With regard to claim 17, Tang et al. disclose an organic electroluminescence display device including a substrate 41 having an insulating surface, at least one X-direction signal line over the substrate and at least one Y-direction signal line crossing the X-direction signal line as seen in figure 1, at least one pixel defined at an intersection between the X-direction and Y-direction signal lines, at least one switching

Art Unit: 2815

thin film transistor and one current control thin film transistor formed over the substrate in the pixel, and organic electroluminescence layer 82 over the substrate. Tang et al. do not explicitly disclose a peripheral driving circuit comprising at least a third thin film transistor formed over the substrate for supplying a signal to one of the X-direction or Y-direction signal lines. Takemura teach an electroluminescent display device having a peripheral driving circuit comprising a third thin film transistor formed over the substrate for supplying a signal to one of the X-direction and Y-direction signal lines in column 16 lines 48-52. Tang et al. further teach the transistors comprising a semiconductor layer comprising crystalline silicon and including source, drain and channel regions, a gate insulating film adjacent to the semiconductor layer and a gate electrode adjacent the gate insulating film. One of ordinary skill in the art would recognize that the in the combination the third transistor would be formed with a similar structure as the switching and current control transistors. The limitation of the transistors being manufactured through the same process is a product-by-process limitation that does not structurally distinguish over the prior art. With regard to claim 18, the gate electrode can be seen over the channel region with the gate insulating film interposed therebetween.

Tang et al. and Takemura are combinable because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to provide a third thin film transistor in a peripheral driving circuit for supplying a signal to the X-direction or Y-direction signal lines. The motivation for doing so is to allow controllable selection and switching on and off of the

Art Unit: 2815

electroluminescent devices. Therefore, it would have been obvious to combine Tang et al. with Takemura to obtain the invention of claims 17 and 18.

Request For Interference

10. Claim 19 of this application has been copied by the applicant from U. S. Patent No. 6,147,451. This claim is not patentable to the applicant because claim 19 is properly rejected under 35 U.S.C. 102(e) as being unpatentable over Tang et al. (U.S. Patent No. 5,550,066)

An interference cannot be initiated since a prerequisite for interference under 37 CFR 1.606 is that the claim be patentable to the applicant subject to a judgement in the interference.

6. Claims 10 and 11 of this application are asserted by applicant to correspond to claim(s) of U.S. Patent No. 6,147,451.

The examiner does not consider this claim to be directed to the same invention as that of U.S. Patent No. 6,147,451 because claims 10 and 11 do not contain the limitations of a pixel array composed of an organic electroluminescent device or an island of a polycrystalline silicon formed thereon in a predetermined pattern. Accordingly, an interference cannot be initiated based upon this claim.

7. Claim 19 is rejected under 35 U.S.C. 135(b) as not being made prior to one year from the date on which U.S. Patent No. 6,147,451 was granted. See *In re McGrew*, 120

Art Unit: 2815

F.3d 1236, 1238, 43 USPQ2d 1632,1635 (Fed. Cir. 1997) where the Court held that the application of 35 U.S.C. 135(b) is not limited to *inter partes* interference proceedings, but may be used as a basis for *ex parte* rejections.

Allowable Subject Matter

8. Claims 6-8 and 13 are allowed.

7. The following is an examiner's statement of reasons for allowance: The prior art of record fails to teach, disclose, or suggest, either alone or in combination, an electroluminescence display device comprising a thin film transistor, an aluminum electrode, a transparent electrode, and a barrier metal layer interposed between the transparent electrode and the aluminum layer.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

8. Applicant's arguments filed 7/29/02 have been fully considered but they are not persuasive.

With regards to claim 1 applicant argued that applicant's admitted prior art and Moeller et al. are not from the same field of endeavor. In response to applicant's

Art Unit: 2815

argument, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Moeller et al. is considered in the field of applicant's endeavor as it is directed towards a semiconductor device and Moeller et al. is reasonably pertinent to the problem with which applicant was concerned, i.e. aluminum and silicon diffusing into each other when in direct contact.

Applicant also argues that there is no reason to combine. This is not persuasive as the rejection clearly states the motivation of preventing aluminum from diffusing into the silicon.

Applicant also argues that the structure of Moeller et al. is different from that of the present invention and thus even if combined would not provide the present invention. This is not persuasive as Moeller et al. was not relied upon for the structure of the claimed invention, but merely to provide a barrier layer between the aluminum and the silicon.

With regard to claims 9 and 14, Applicant argues that the claims further recite another barrier metal layer interposed between the aluminum electrode and the transparent electrode. This is not persuasive as neither claim 9 nor claim 14 recites such another barrier layer. Claim 9 recites only one barrier layer, which is between the source or drain and the aluminum electrode. This barrier layer is taught by the

Art Unit: 2815

references. The additional barrier layer is not claimed, thus the rejection is deemed proper.

With regard to claims 10, 11 and 15-18, applicant argues that neither Tang et al. nor Takemura teach a peripheral driving circuit comprising thin film transistors formed over the same substrate as the thin film transistors of the pixels in combination with an organic electroluminescence display device wherein the thin film transistors comprise crystalline silicon. First, it is not clear which limitation of the claims is being argued as not being taught since the above statement is a summary of the entire claim. However, Tang et al. and Takemura do teach all the claimed features. Tang et al. and Takemura teach the peripheral driving circuit comprising thin film transistors on the same substrate as the thin film transistors of the pixels. Tang et al. and Takemura clearly teach the device is an organic electroluminescence display device. Tang et al. and Takemura also clearly teach the thin film transistors comprising crystalline silicon. Thus, the rejection is proper as all the claim limitations are taught by the prior art.

Conclusion

1. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to N. Drew Richards whose telephone number is (703) 306-5946. The examiner can normally be reached on M-F 8:00-5:30; Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


NDR
November 12, 2002


ROLF HILLE
DIRECTOR, TC 2800